



High Pressure Polymeric Component FE Analysis

Description

A series of analyses were required for various design configurations of a stainless steel reinforced composite polymeric component (part of a high pressure capsule), to ascertain acceptable mechanical integrity in terms of stress for lifting purposes and maximum deflections for operational acceptability.

The equipment was to be subjected to a wide range of pressure and mechanical loads during operation so an FE model and analysis was required to optimise the design.

Both the SS insert and polymeric component geometry was modelled using a 3D Cad system and full 3D "solid" elements.

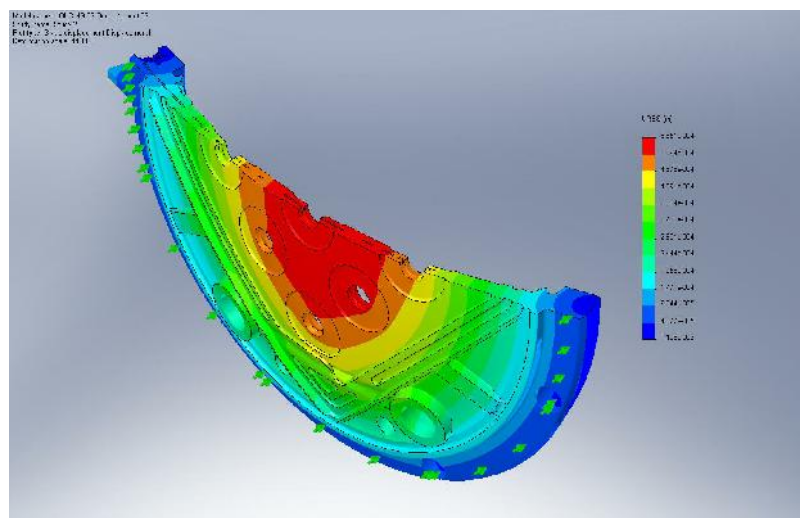
The component was mounted using fixed position restraints to reproduce the correct mounting configuration and stiffness. Varying pressure loads were applied in all 3 axes and displacement and stress levels calculated.

Disciplines Used

- Linear stress finite element analysis & fatigue life analysis.

Specification Summary

- Main structure materials: Stainless steel inserts with glass reinforced composites (PPA / PPS)
- 3D solid finite element model of various geometries
- Linear stress analysis undertaken to assess overall mechanical integrity and fatigue life
- Max pressure = 75 bar. Pressure loading varied dependant on sealing configurations investigated



FE Model Pressure Induced Deflected Shape